Freshwater Standards Rule Revision

UPDATE

Sediment Work Group

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Freshwater Standards Rule Revision

Goals for Today

Hear Comments from SWG on

- **Review of Freshwater SQV Report**
- **Biol. Framework & Suite of Bioassays**

Discussion on comments received

- Ecology received three reviewer comments for the FW SQV draft technical report
- The comments are available on line; Ecology responses will be posted when completed.
- Major points or reoccurring themes that need discussing include:
  1. Bioassays and Endpoints,
  2. What to do with Reference comparison,
  3. Consideration of analytical limitations (all compounds) and background (metals), and
  4. TOC normalization.

Reference comparison

- Requiring reference for all testing would be huge burden.
- However, reference can be useful.
- If reference performance criteria is included in the rule, language regarding when it is used is needed.
- Reference performance criteria could be provided in guidance, and/or reference envelope approach could be provided in guidance.

Consideration of analytical limitations (all compounds) and background (metals)

- Unlike 2003 run, no compounds have proposed values at or below typical detection limits.
- It was noted that the proposed nickel SQS is below state soil background levels.
  - Possible solution- natural background
  - Issues- metals may be regional in nature due to variations in natural sources (volcanoes, mineral deposits, etc.)

TOC normalization

- Contaminants associated with TOC, so higher TOC sediments will have higher contamination levels even in the absence of a source.
- Additionally, higher TOC would potentially reduce bioavailability since it would adsorb contaminants, reducing pore-water concentrations.
- Normalization to TOC should improve the relationship between contaminant loads in the sediment and toxicity/bioaccumulation.

TOC normalization

- **TOC normalization did not result in improvement of SQV reliability.**
- **TOC normalization has known issues when TOC is extremely low or extremely high.**
- **State of the art TOC analyses is VERY complex. Multi-compartmental type models using different Koc's for multiple types of TOC still does not improve relationship as much as one would hope.**

FW Sediment Biological Standards

Framework for Biological Standards

- Confirmatory bioassays trump chemistry
- Minimum of 3 tests selected from suite
  - Represent range of sensitivity seen in a benthic community
  - Ideally many species and sensitive life-history stages
  - Use acute and chronic tests

Bioassay and Endpoint Definitions

Test	Acute Bioassays	Chronic Bioassays	Lethal Endpoint	Sublethal Endpoint
Hyalella azteca				
10-day mortality	X		X	
28-day mortality		X	X	
28-day growth		X		X
Chironomus dilutus				
10-day mortality	X		X	
10-day growth	X			X
20-day mortality		X	X	
20-day growth		X		X
MicroTox				
100% PoreWater		X?		X

FW Sediment Biological Standards

Bioassay Suite to Include At Least:

- **3 Endpoints**
- **1 Chronic Test**
- **1 Sublethal Endpoint**
- **2 Species**

Interpretation

- **SQS Hit – Single SQS level hit**
- **CSL Hit –**
  - **2 or More SQS level hits**
  - **1 or More CSL level hits**

Test	QA limits Control	QA limits Reference	SQS	CSL
Hyalella azteca				
*10-day mortality	C ≤ 20%	R ≤ 25%	T – R > 15%	T – R > 25%
*28-day mortality	C ≤ 20%	R ≤ 30%	T – R > 10%	T – R > 25%
**28-day growth	CF ≥ 0.15 mg/	RF ≥ 0.15 mg/	T/R < 0.75	T/R < 0.6
Chironomus dilutus				
*10-day mortality	C ≤ 30%	R ≤ 30%	T – R > 20%	T – R > 30%
**10-day growth	CF ≥ 0.48 mg/	RF/CF ≥ 0.8	T/R < 0.8	T/R < 0.7
*20-day mortality	C ≤ 32%	R ≤ 35%	T – R > 15%	T – R > 25%
**20-day growth	CF ≥ 0.48 mg/	RF/CF ≥ 0.8	T/R < 0.75	T/R < 0.6
Microtox®				
**15min decrease in luminescence	CF/CI ≥ 0.72	RF/CF ≥ 0.8	T/R < 0.85	T/R < 0.75

Questions?